Football rivalry (2) P94654_en

Novè Concurs de Programació de la UPC - Final (2011-09-21)

Two long-time rival football teams, let us call them B (for beautiful manners) and M (for miserable — very, very miserable — manners), are playing again. Both teams are exhausted, so the first to score a goal will win the game for sure. At this moment, team B has the ball. If they decide to attack, there is a probability w_B that they manage to score, thus winning the game. Hovewer, with probability ℓ_B they will receive a goal, thus losing the game. With probability $1 - w_B - \ell_B$ they will just lose the possesion of the ball. Team B has another option: to pass the ball around. In that case, the possesion of the ball will eventually go to team M. Then we will have a simmetrical situation: If team M goes for an attack, they will immediately win with probability w_M, they will immediately lose with probability ℓ_M, and the ball will go back to team B with probability $1 - w_M - \ell_M$. If they decide to just pass the ball and wait, eventually the possesion of the ball will go back to team B.

Given w_B, ℓ_B, w_M and ℓ_M, and assuming that both teams take the best decisions (to attack or not to attack) and that team B has the ball now, which is the probability that team B will win?

Input

Input consists of several cases, each one with four real numbers w_B, ℓ_B, w_M and ℓ_M between 0 and 1. Assume $w_B + \ell_B \leq 1$ and $w_M + \ell_M \leq 1$.

Output

For every case, print the probability that team B will win with four digits after the decimal point. (The input cases have no precision issues.) A situation where no goal will be scored (an eternal tie) is similar to a fifty-fifty situation. Consequently, print "`0.5000`" in this case.

Sample input

```
1   0   0.7 0.2
0.3 0.6 1   0
0   0   0.3 0.6
0   0   0.1 0
0.4 0.2 0   1
0   1   0.4 0.2
0.4 0.2 0.4 0.2
0   0   0   0
```

Sample output

```
1.0000
0.3000
0.5000
0.0000
0.6667
0.3333
0.5714
0.5000
```

Problem information

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